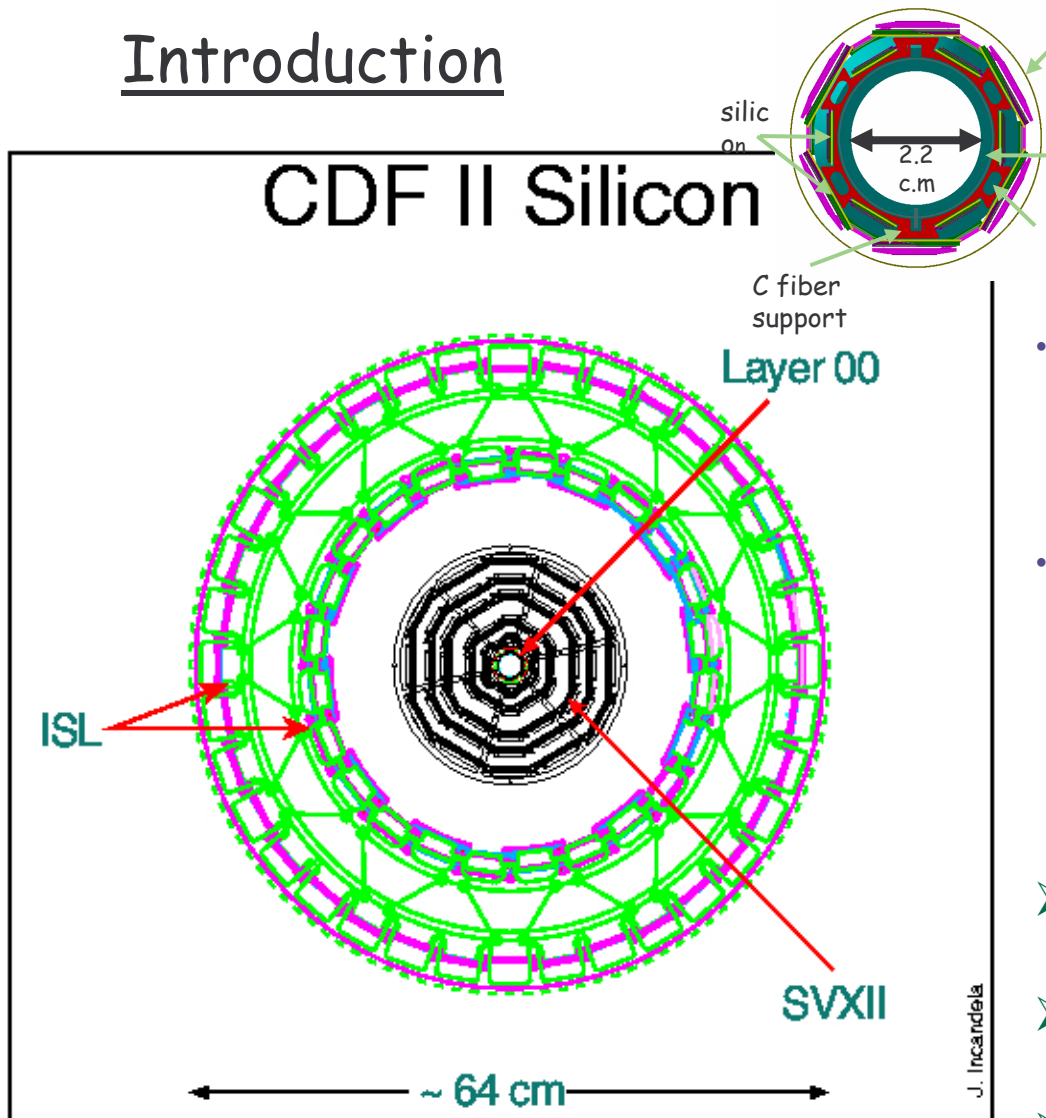


What You should know about the Silicon

Friendly Advice:

- Learning about how things work will save time, increase efficiency, and earn **Glory and Praise**
- Your SciCo is **NOT** an expert, so don't let them waste too much time theorizing, page a **real expert**
- **Obey** the Silicon Pager Carrier (lest you end up being one)

Introduction



L00 (1 layer)

- 6 ϕ wedges (0-5) \times 2 Barrels ("East and West") \times 4 Ladders
- $LB[0,1] W[0-5] L[0-3]$

SVXII (5 layers)

- 12 ϕ wedges (0-11) \times 6 Bulkheads (0-5) \times 5 Ladders
- $SB[0-5] W[0-11] L[0-4]$

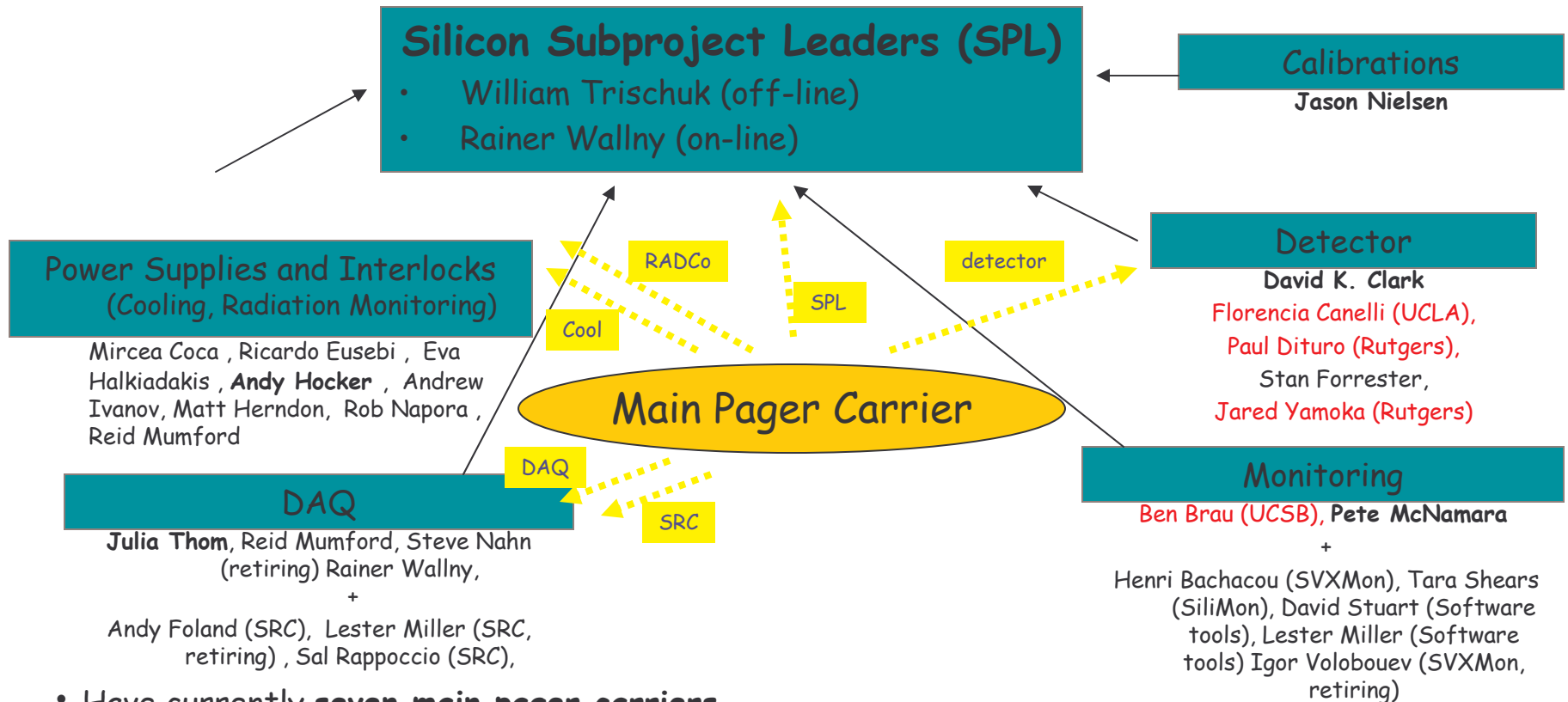
ISL (2 layers)

- 6 ϕ "wedges" (0-5) \times 6 Bulkheads (0-5) \times 5 Ladders
- $IB[0-5] W[0-5] L[0-4]$

Total: 722432 channels, sharing same DAQ

- One of the biggest Si beasts currently on earth
- Lives dangerously close to the beam (~1.3 cm for L00)
- **CANNOT BE ACCESSED!**
- **Needs to operate until 2009**

CDF Silicon Operations Group



- Have currently **seven main pager carriers**
- The Main Pager Carrier is a **rapid-response 'Generalist'** - can draft pager carrying 'Specialists'
- **RadCo** and **Cooling Experts** are special -called by CDF shift crew in parallel
- The **SPLs** are backup to the Main Pager Carrier - some decisions need to be deferred to the SPLs

Shift Crew calls Main Pager Carrier in all cases, RadCo and Cooling Expert in addition for cooling and radiation incidents, and the SPLs if any is not available.

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Online Silicon SPL
wallny@fnal.gov (Rainer Wallny)

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Introduction: Safety is #1!

The silicon detector can be permanently damaged by:

- A. Powering (STDBY or ON) without adequate cooling
- B. Large charge deposits (from unstable beam) while ON
- C. Incorrectly powering
- D. Exciting 'Wire bond Resonances'

We minimize chances of incurring such damage by:

- A. Employing PLCs to monitor status of silicon cooling
- B. Employing various loss monitors to determine beam stability
- C. Employing "clever" monitoring/control software and hardware (a 'resonance buster' board)

And as a final mitigating factor:

We rely on YOU to help quickly spot potential dangers.

Silicon's Dramatis Personae in the Control Room

- A LV and HV Control System which talks to the IFIX slow control system:
'The Power Supply GUI'
- A system to monitor currents - **IMON**
- A (rather involved) cooling safety interlock system which talks to IFIX but also provides three independent
'Sono-Alarms' and two CRASH BUTTONS
- A system to monitor radiation levels providing another **'Sono-Alarm' -> Andy's Talk**
- 8 **bOfib0x** (in collision hall) and 9 **b0svx0x** (in 1st floor) readout crates, with two dedicated **SRCs** (silicon readout controllers) in b0svx02 (SVX), and b0svx06 (ISL+L00).
- A system (a 'consumer') to monitor the 'digital' integrity of the incoming data: **SVXMon -> CO's job**
- A system (a 'consumer') to monitor the 'analog' integrity of the incoming data:
SiliMon -> CO's job

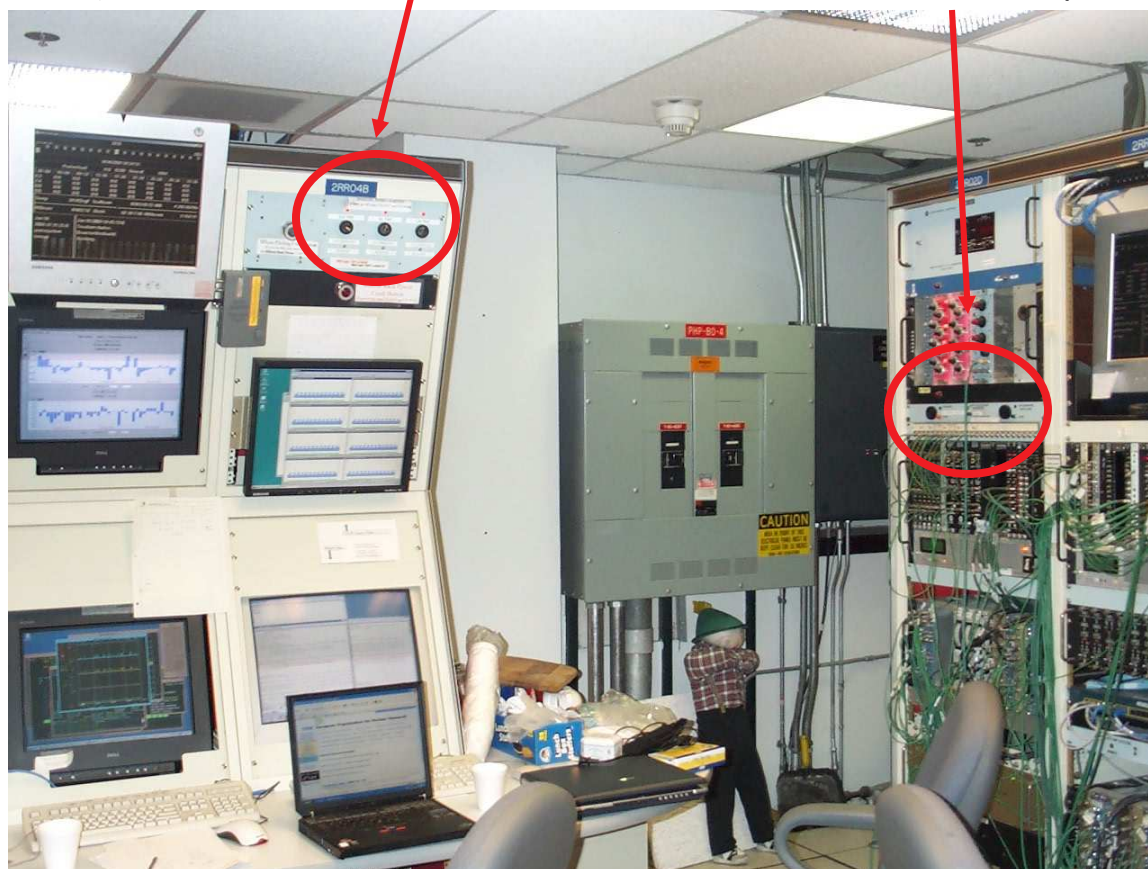
Monitoring: Where Stuff is at

A. Silicon Cooling... overall status from

- "Process Systems Alarms" summary
- Cooling Sono-Alarms

B.

Radiation Sono Alarms



(from iFIX)

Process Systems
Alarms

HVAC

gas

Silicon
Cooling

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Monitoring: Where Stuff is at

B. Beam Losses

- Beam losses from ACNET
- TevMon web page (also at DAQ)

C. Power Status

- HV Summary and Global Alarms
- IMON
- Power Supply GUI



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Monitoring: When All is Good

IF **Silicon Cooling** .and. 

- Cooling in good shape

Obey TevMon, ACNET Losses, SI_TEST1 and SI_TEST2 plots (put in e-log)

- Beam is stable

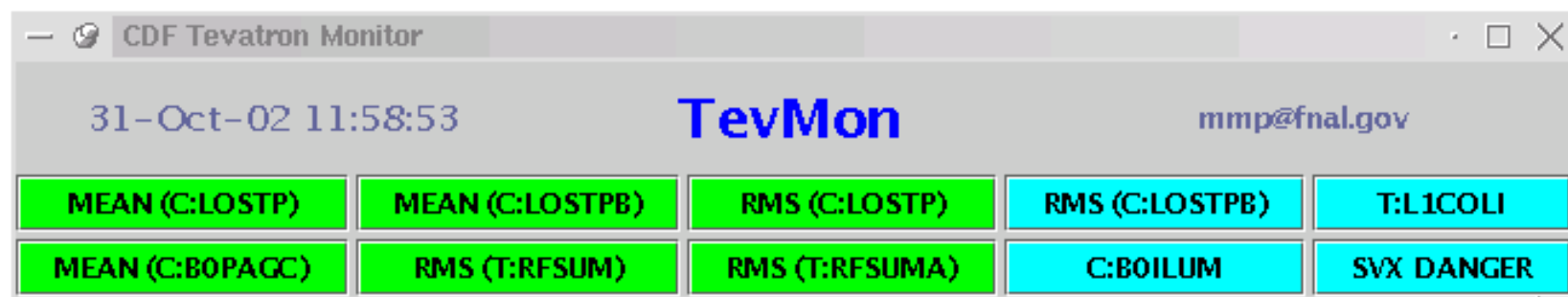
IF **L00** .and. **SVX** .and. **ISL** on Global Alarms Sum'ry

- Powered wedges OK

THOU SHALT NOT OPERATE SILICON WITH BEAM UNLESS.....

- **The electron lens is on**
 - Monitor w/ ACNET variable T:L1COLI
 - **There is "normal" DC beam in the machine**
 - Monitor w/ ACNET variables , C:BOPAGC and C:BOAAGC gated on abort gaps
 - No sudden unexplained longitudinal growth of beam (T:SBDMS)
 - No sudden unexplained change in luminosity ($\Delta C:BOILUM > 10\%$)
 - **The Tevatron Radio Frequency (RF) system is stable**
 - Monitor w/ ACNET variables , T:RFSUM and T:RFSUMA
 - **The Tevatron losses are minimal and stable**
 - $LOSTP, LOSTPB < 20$ kHz, $\Delta LOSTP, \Delta LOSTPB < 2.5$ kHz/hour,
No persistent spikes > 25 kHz
 - **The Beams Division is not doing any "harmful" parasitic studies**
 - When in doubt, page Silicon
 - **Silicon stays in STANDBY between stores unless Beam warrants "OFF"**
 - Avoid excessive power cycling & associated thermal stresses
 - Hints that STANDBY safer than ON, but that STANDBY may not be totally safe
 - **No silicon use in DAQ/trigger tests without permission from silicon pager (this includes L2TORTURE!).**
- } Some if this is 'automatized' in TeVMon (see later)

TevMon Beam Conditions Monitor



- Monitors ACNET variables for silicon safety
- One cell for each criterion in ACNET checks - plus one cell for overall decision on SVX Warning/Danger!
- **PINK signifies WARNING** - find the reason for the warning using ACNET. Silicon can continue biased unless warning text instructs otherwise.
- **RED signifies ALARM** - put DAQ in HALT and put Silicon to STANDBY unless warning text instructs otherwise. Have SciCo call MCR, page silicon.
- Before turning on silicon after scraping, OBEY TevMon.
- TevMon is an essential process
 - check the time stamp to make sure that it is updating
 - Has web output at <http://b0dap61.fnal.gov/~cdfdaq/tevmon.html>

Radiation Problems ("EEEEEEEEEE")

For SVXRAD plots, follow RADMon run rules.

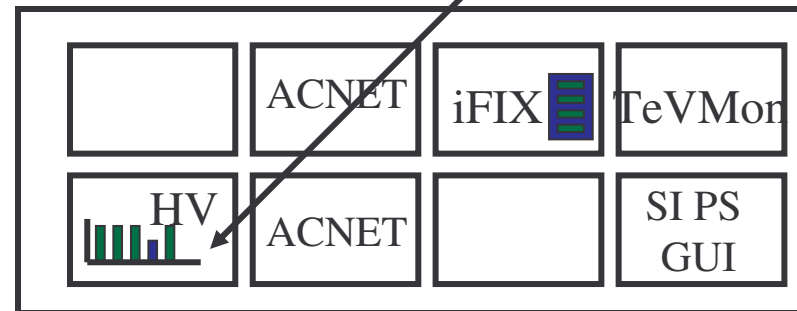
On alarm, page **Si:218.8227** and **RadCo: 266.2713**

IF any of the silicon specific ACNET variables are out of range (see monitoring ACE instructions) *or otherwise indicate unstable beam conditions*

Ask SciCo to notify MCR crew chief and find out why

- **Meanwhile page silicon: 218.8227**
- **If you fear for safety of silicon:** use HV Summary button to bring to STDBY (will take a few minutes)

Also see next Talk



Anatomy of Si Power Supply System

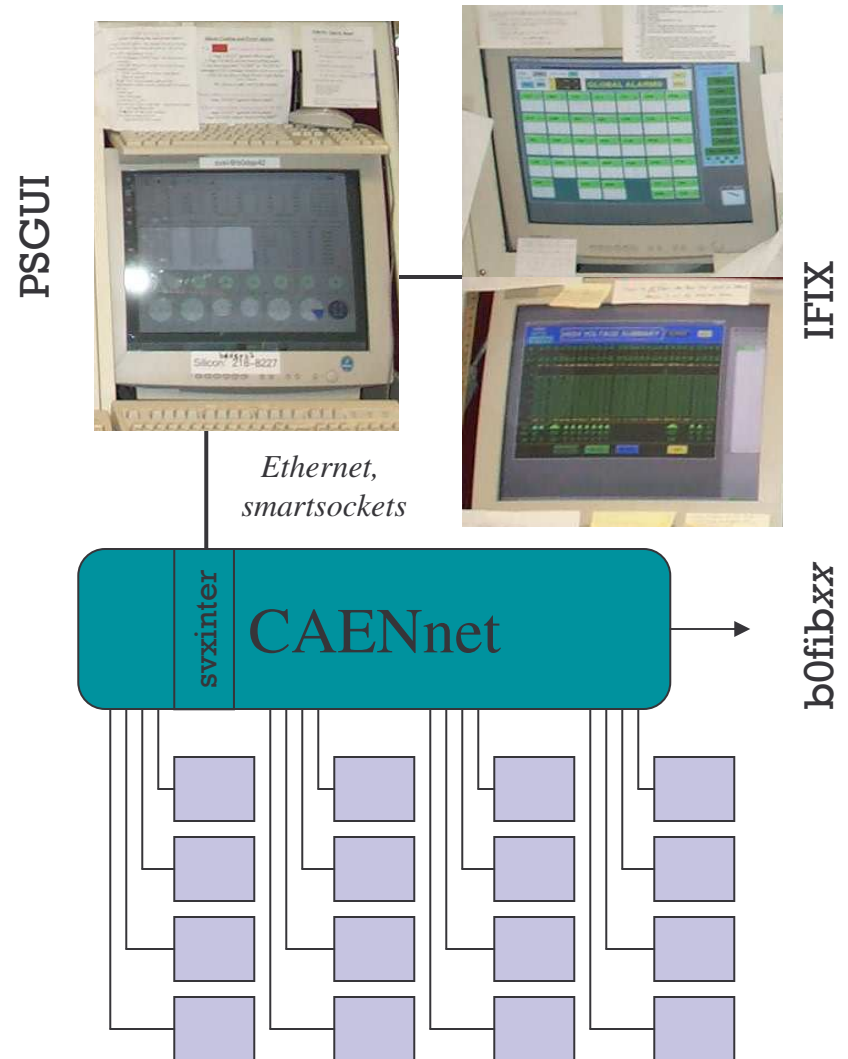
- 16 CAEN crates with 6-10 power supplies
- Crates \leftrightarrow svxinter (MVME) via CAENnet
- svxinter \leftrightarrow PS GUI, b0fibxx (OFF \rightarrow STBY)
- PSGUI \leftrightarrow IFIX

Each Power Supply (PS) powers:

- One Portcard (**2VDOIM, 5VDOIM**)
- Up to 5 ladders which each have:
 - **AVDD** - Analog Low Voltage
 - **DVDD** - Digital Low Voltage
 - **BIAS0** - Bias (high) Voltage
 - **BIAS1** - Bias Voltage (ISL only)

STANDBY == **2VDOIM, 5VDOIM AVDD, DVDD**

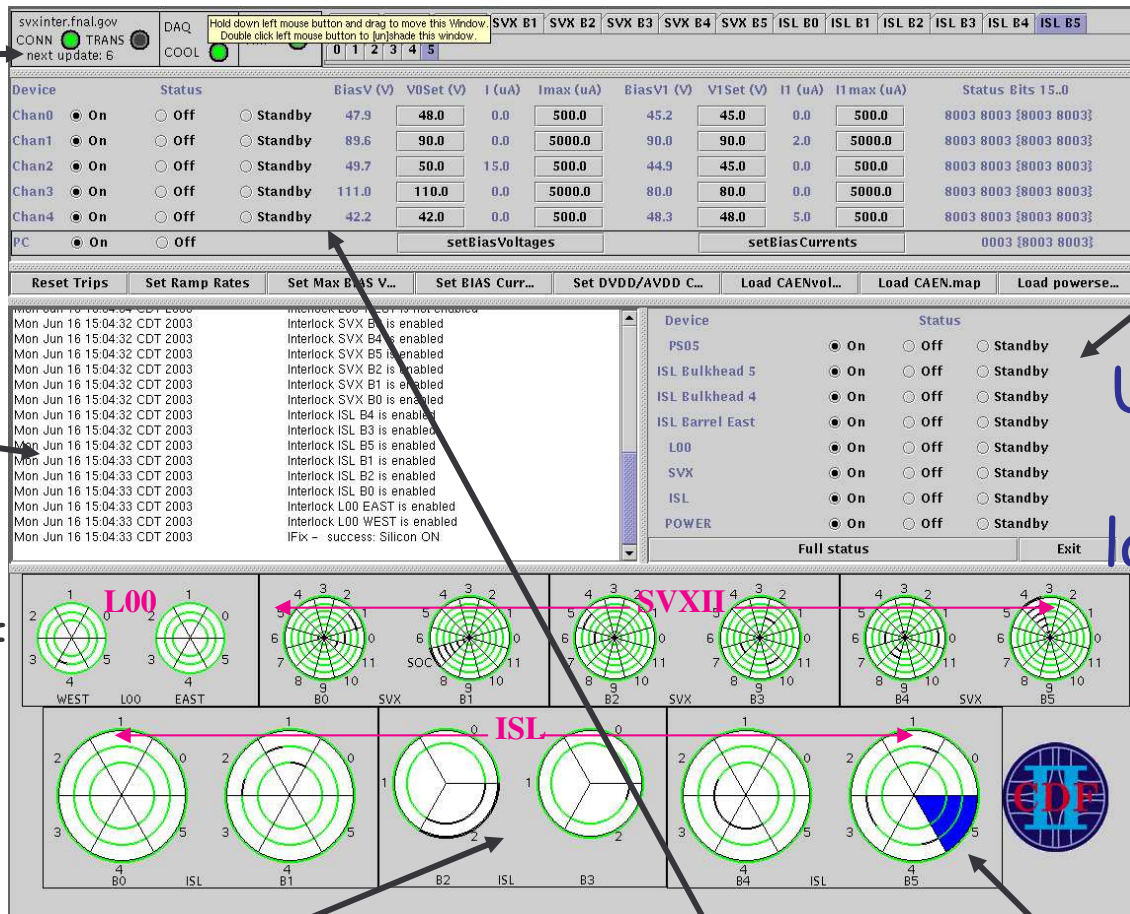
ON == STANDBY + **VBIAS0 (1)**



Quick SI-PS-GUI Tutorial

Check this
is
counting
down few
times/shift

Message window
reports problems
(e.g. trips) and
global actions
(e.g. power ON of
all silicon)



Coarse
buttons
power more
than just one
ladder

Use GUI to
recover
ladder trips

(Use iFix
mostly)

Wedge by wedge status:
yellow = STBY green = ON
red = OFF s/b ON black = OFF s/b OFF

Select particular wedge by
clicking on appropriate "pie
piece"

blue = selected

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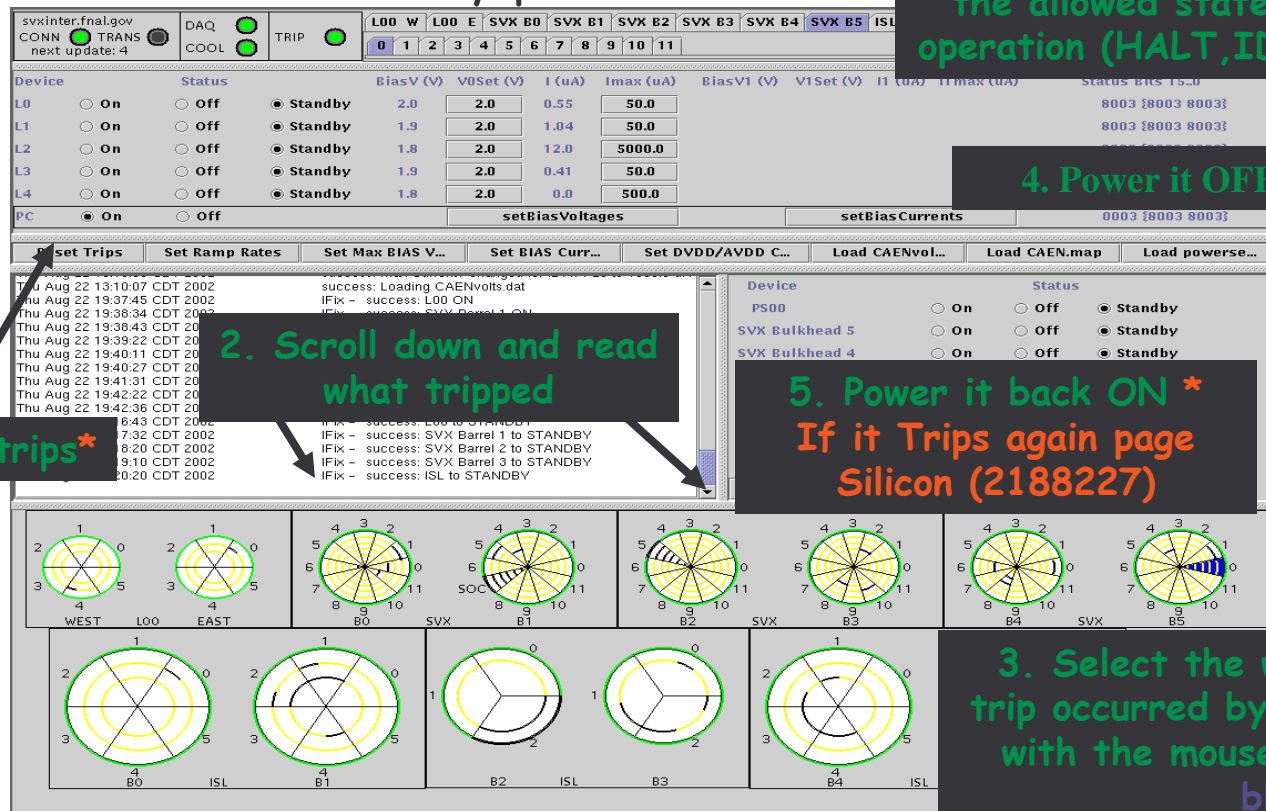
13

Si Power Problems/Trips ("Tweet")

IF **L00** .or. **SVX** .or. **ISL** on Global Alarms Sum'ry

- During OFF→STBY, will clear themselves...
- Else follow Recovery procedure

0. Make Sure RC is in one of the allowed states for this operation (HALT, IDLE, READY)



4. Power it OFF *

1. Reset trips*

2. Scroll down and read what tripped

5. Power it back ON *
If it Trips again page Silicon (2188227)

3. Select the wedge where the trip occurred by left clicking on it with the mouse (should become blue)

* Wait for confirmation of your actions from the scroll down window

waliny@TNAI.gov

If the same device trips twice or more during your shift page Silicon (2188227)

CAEN crate communication failures (aka crate 'Hockerization')



He Who Used to Hocker the crate ...

1. IFIX alarm/trigger inhibit

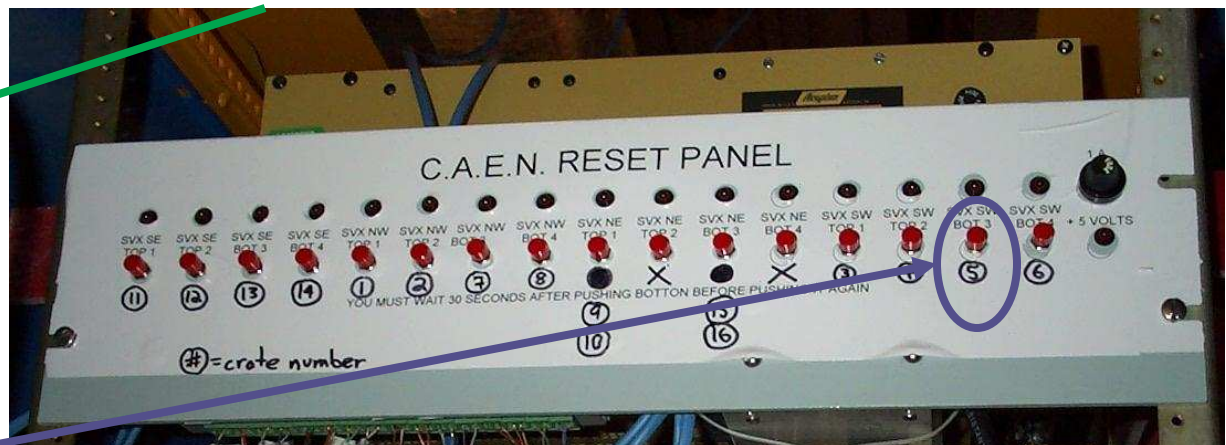
DEVICE	DESCRIPTION	LOW ALARM	LOW WARNING	CURRENT VALUE	HIGH WARNING	HIGH ALARM	IGNORED?
SVX POWER SUPPLIES (see GUI)							
PS-TRIP	This field filled at alarm time			OK			NO
PS-ALARM	Crate 5 communication failure			ALARM			NO

2. Note crate number

3. If running w/ silicon, bring run to HALT state

4. Go to rack 1RR34G (easternmost row of racks in 1st floor counting room)

5. Plug in reset power supply (labeled with a big tag)



6. Press crate's reset button for 1 sec

7. Wedges in the crate are now OFF, return to ON or STBY with buttons on IFIX HV page

8. After trigger inhibit clears, RECOVER and RUN

9. Unplug the reset power supply

10. Make note in e-log, page silicon if there are problems or if in doubt.

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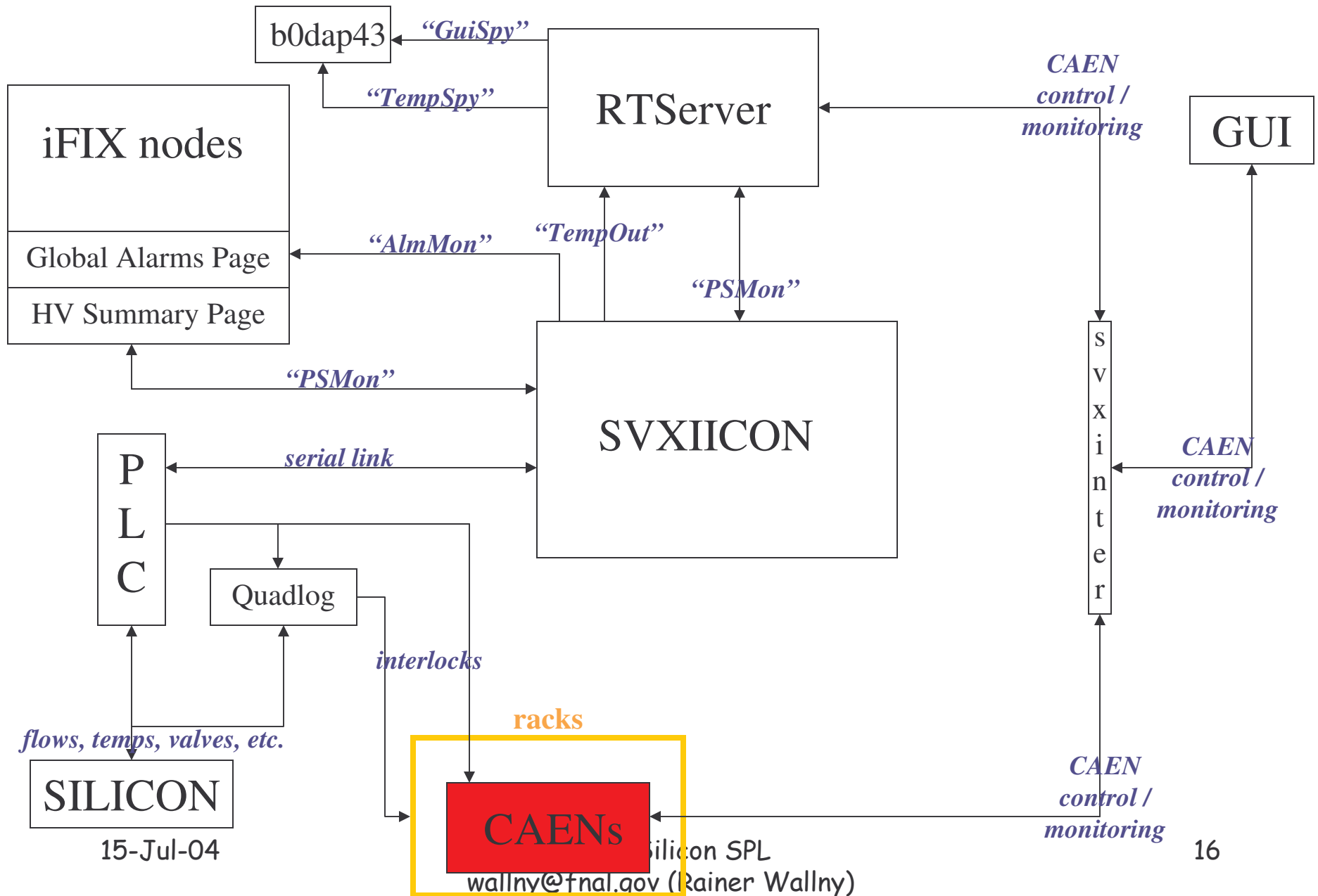
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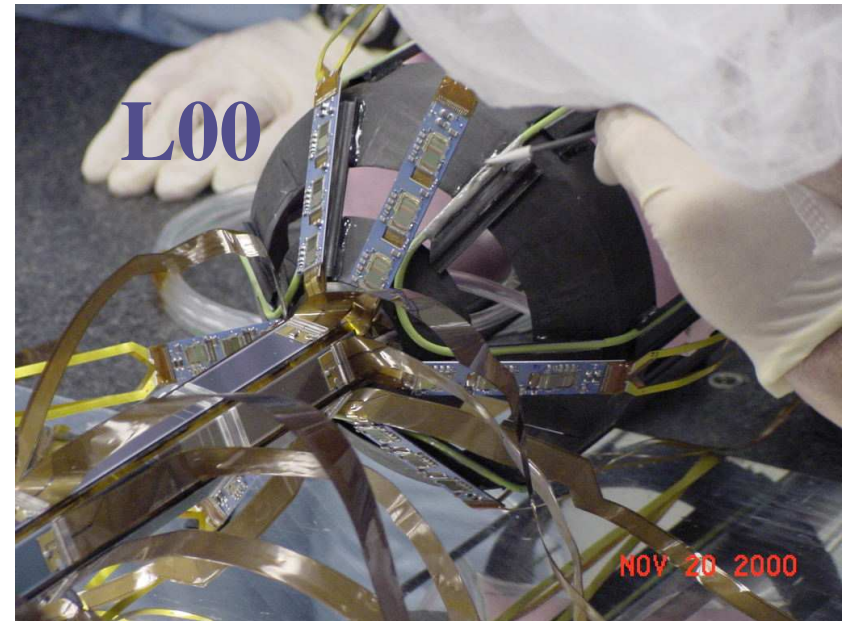
Soon to come:
Automatic Hockerization!

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The Big Picture (not for the faint of heart)



Detector on-board cooling



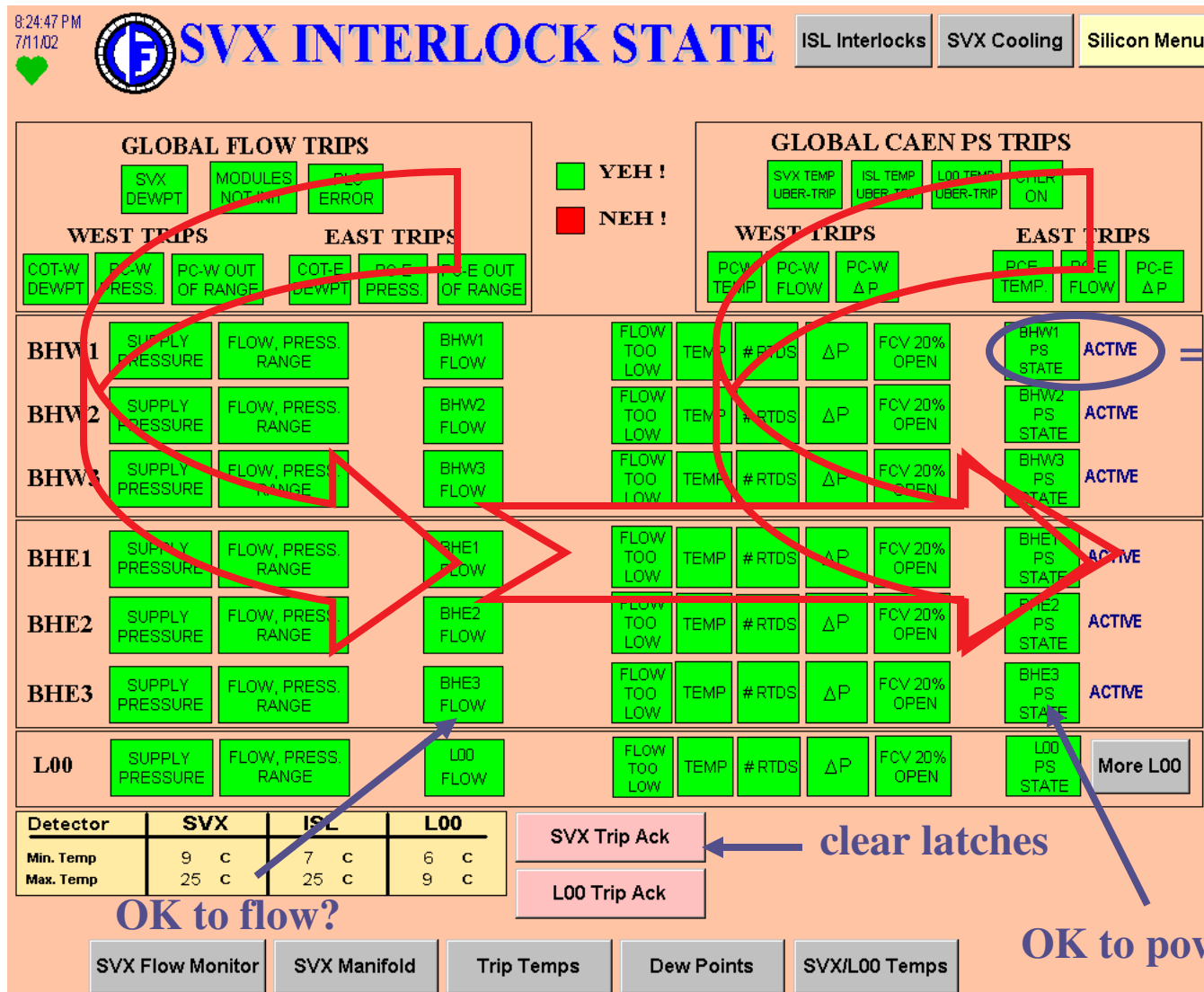
- All material is very light (it's meant to be that way)
 - Highly integrated ASICs do a lot of complex tasks and dissipate a lot of power (try touching your desktop CPU with its whopping fan on it)
- => Cooling is essential else the silicon turns into molten sand within minutes (it has happened before - not to CDF)
- Have a highly sophisticated hardware interlock system in place to do 'the right thing' - but need YOU to verify it actually happened.

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Interlock logic at-a-glance



Cooling Problems ("OU-OO" or "EEE")

If **Silicon Cooling** or



(Loud, High Pitched screech and at least one LED off)

- Page 218 8227 (Si Pager)
- Page 218 8626 (Interlock Pager)
- Call Cryo and ask what happened

IF THE COOLING FLOW HAS STOPPED:

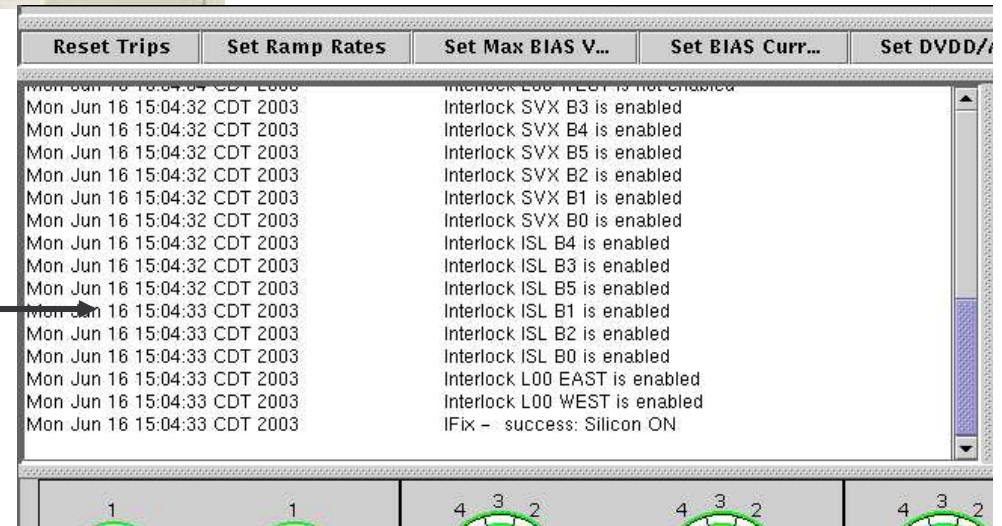
- Check Si PS GUI:

-Verify that relevant detector was turned off by interlock system
"TRIP ISL B0 W2 External Trip"

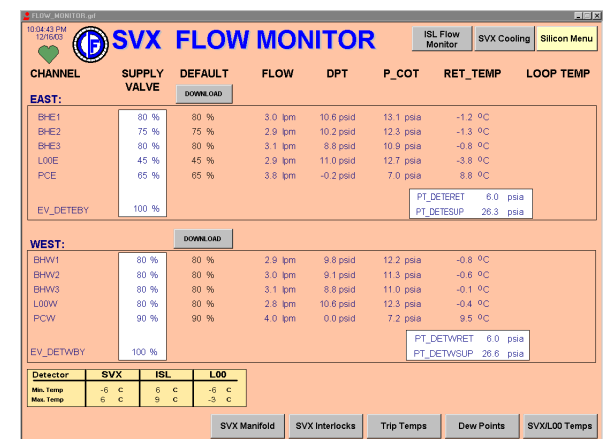
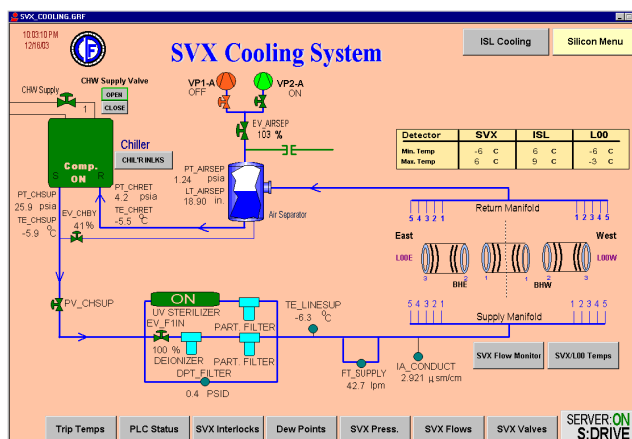
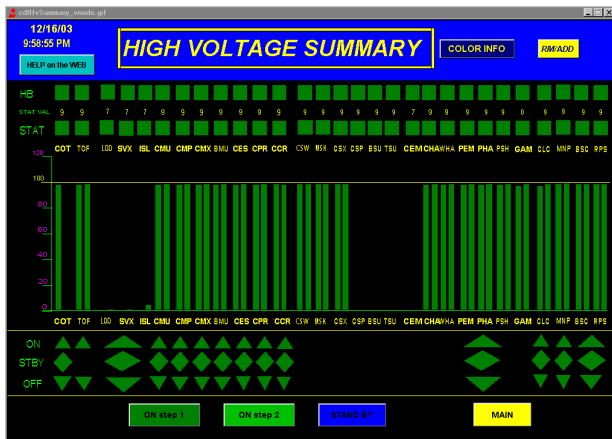
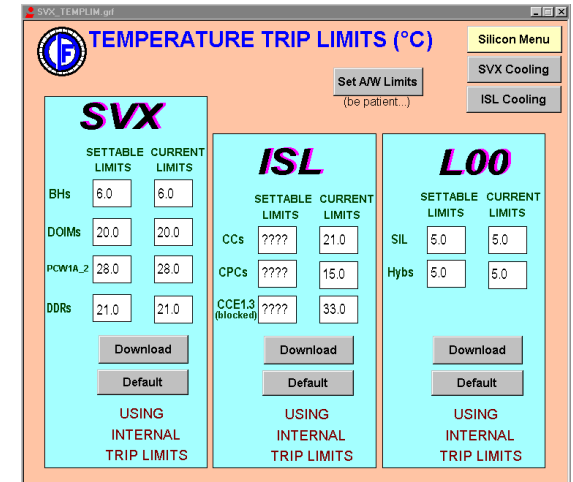
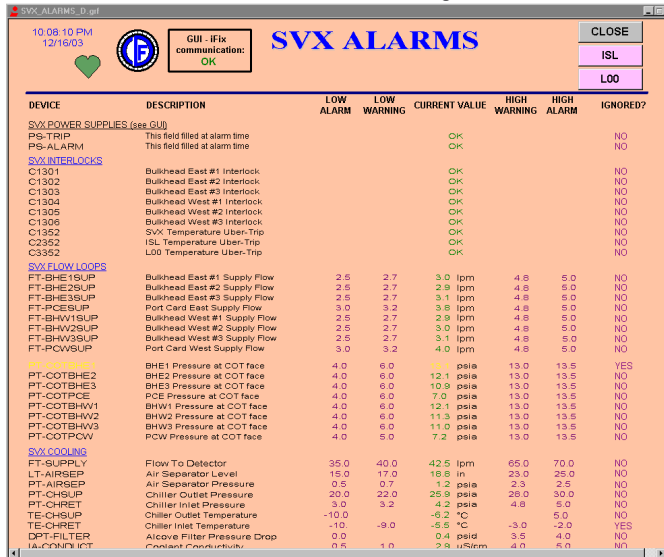
-IF persistent (1 or 2 ok) "ALERT" .or.
"ILLEGAL" messages (check time stamp):

OR IF IN DOUBT (i.e. GUI hung/unresponsive):

**Hit the Silicon Rack Power
Crash Button**



Useful iFIX pictures



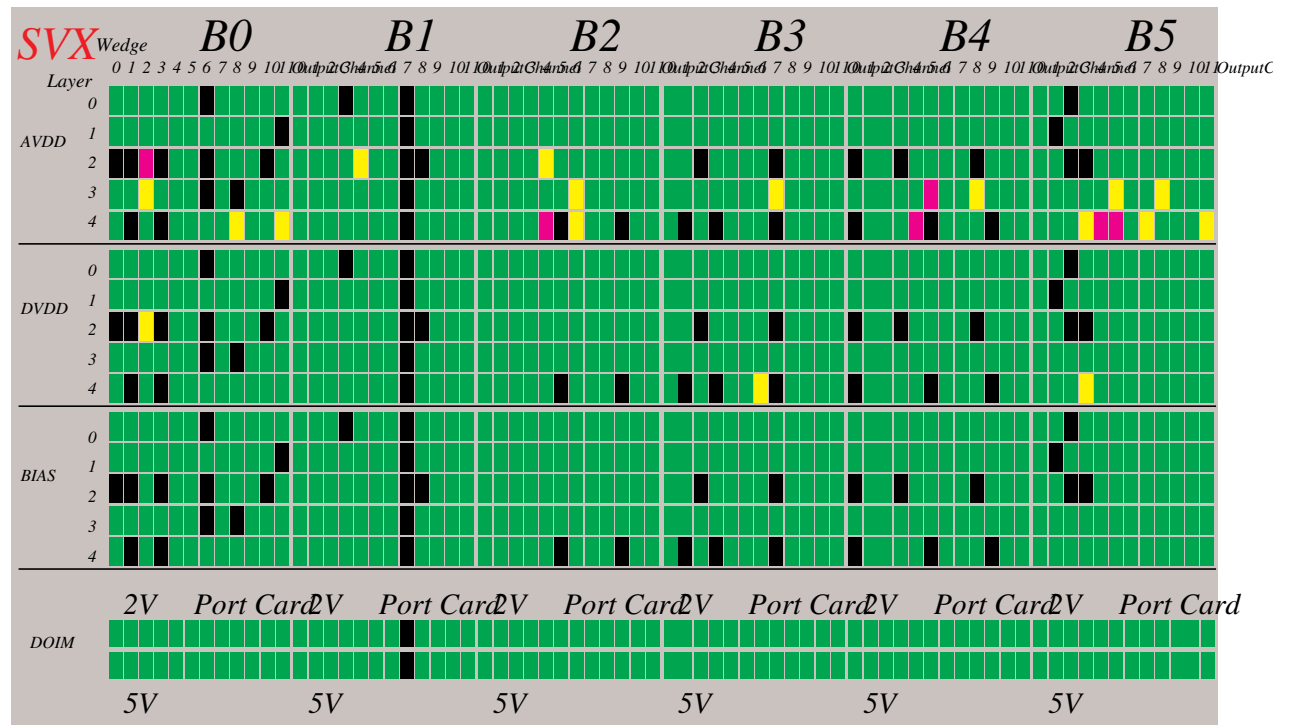
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Quick IMon Tutorial

- *We need your help monitoring these currents, which may signal imminent danger to the silicon.*
- Tracks currents for experts by color:
 - GREEN = Normal
 - YELLOW = Warning
 - PINK = Alert
 - RED = Trip
 - BLACK = Not Powered



Instructions for restarting iMon are above the silicon terminal

Ace's IMon Responsibilities

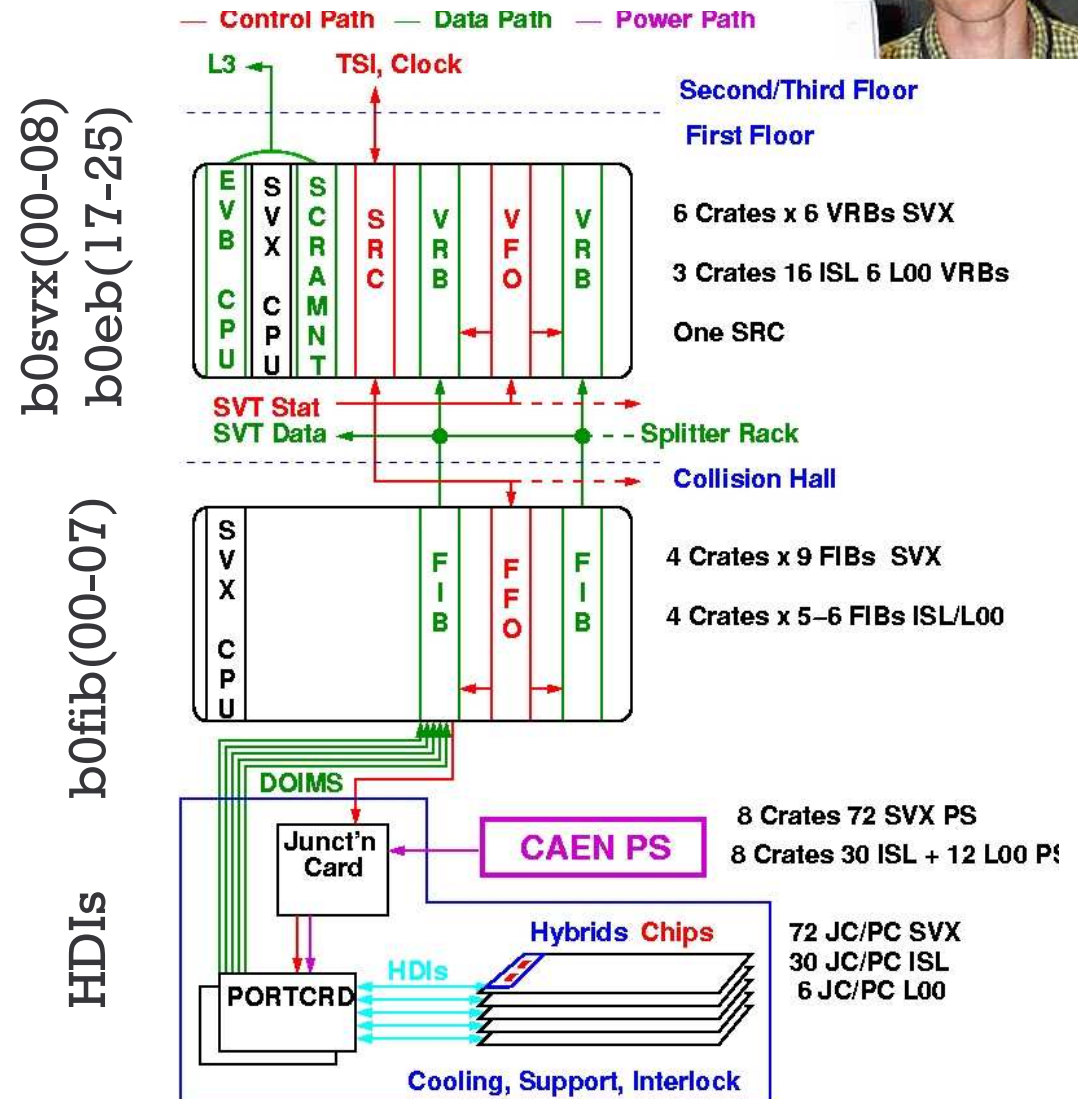
- Aces should respond to *any* IMon cells that have turned **pink** during data taking only.
- When data taking begins, Ace needs to unmark all IMon cells.
- If cell is **pink** during data taking, ACE should:
 - Note the ladder and current which has latched.
 - Unmark cell.
 - If it turns **green**, document in e-log, nothing more.
 - If it again has turned **pink**, talk to CO and see if latched ladder was correlated with errors (red in SVXMon CellID Status Map)
 - If so, have DAQ Ace perform HRR if it has not automatically occurred anyway.
 - Unmark the cell, wait a few minutes and plot and paste the history into the elog
 - If ladder stays **pink** after unmarking and HRR, page silicon pager carrier 218 8227.



Silicon from the DAQ Perspective

• Silicon is different

- 17 crates, but TWO **SRCs** which talk to TSI
 - All **BUSY**, **DONE**, and **ERROR** timeouts come from them though problem may be elsewhere
 - SRCs live in **b0svx02** and **b0svx06**
- Due to SVT, Si reads out to VRBs after L1A (not L2A)
 - VRBs are crucial
 - **L1DONE** signal to TS indicating data transferred to VRB
- CPUs play role only in initialization and monitoring
- b0svx** crates shared with EVB - **you can't shepherd them and if you reboot them by other means, you have to clean the EVB!**



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Silicon DAQ configuration

- Partitioning (usually set automatically)
 - **CrateSet**: **All Vrb crates** included, dropping Fib crates is OK.
 - Choose an **SvxSet** (e.g. **SVX_NO_PEDS**) (run dependent parameters)
 - TS settings to play nice with the SRCs
 - **IgnoreBusy** = false else the TS ignores the VRBs.
 - **UseSrc** = true else the TS ignores L1 DONE
- Initialization- **No Gratuitous Shepherding!**
 - Fib crates also initialize ladders, which sometimes do not "readback" the init parameters correctly:
b0fib02:Error Initializing HDI Slot 18 Chan 6: SB2W7 **b0fib02**
Re-issue CONFIG for that Fib crate only, look for Trips. **Do not power cycle the crate, it will not help.** If persistent, page Si pager, who will either mask off or remove the ladder
 - Only when a crate **does not respond** to RC signals does it justify rebooting it
- **ALSO NOTE: NEVER POWERCYCLE b0svx02 and b0svx06 !**

Silicon DAQ Runtime Errors

Run Time Errors: **Ha**lt-Recover-Run is first line of defense.

If anything persists, page Si pager. You might first see an error condition from a silicon crate - get more information on **HALT** when Si crates query all boards and find potential problems

i.e. **Silicon Timeout:BUSY- Slots: 10:fa00 12:fa20...**

NOTE: on HALT will see also messages like

(MLE) b0svx04:Messenger:1:51:03 PM->Silicon Resonator:S1 18 Ch 1 -> e481:
Bytes: 00064

(MLE)b0svx00:Messenger:1:51:03 PM->Silicon Resonator:S1 20 Ch 6 -> e0b1:
Bytes: 00040

These are only meaningful if a resonance was detected, see below.

- **Done TO:** Data did not get sent to the VRB. Very rare, usually means a VRB is bad. Error handler
- **L1 Done TO:** TS has lost count of how many free buffers in Si Chips. Exceedingly rare.
- **Busy TO:** Means VRB has no more space for events. **Exceedingly common**, as **EVB** stops when any data corruption is detected **anywhere** (normally **NOT** in a Silicon crate) and the Silicon VRBs fill up first. Find data corruption and page responsible group.
- **Done TO from TRIGGER_SCALERS_00 Rate too high:** L1A rate too high to safely operate silicon. Usually trigger table is corrupt or there's a hot trigger. Page Trigger, look at TrigMon.

Silicon DAQ Runtime Errors (cont'd)

Resonance Detector

- **SRC Fatal Error:** Data taking has stopped due to a serious error condition - HRR should help.

current SRC firmware ailment:

SRC Fatal Error: S1 5 L2A w/o L1A

depending on data taking conditions we might want to be paged immediately, else HRR out of it and make a note

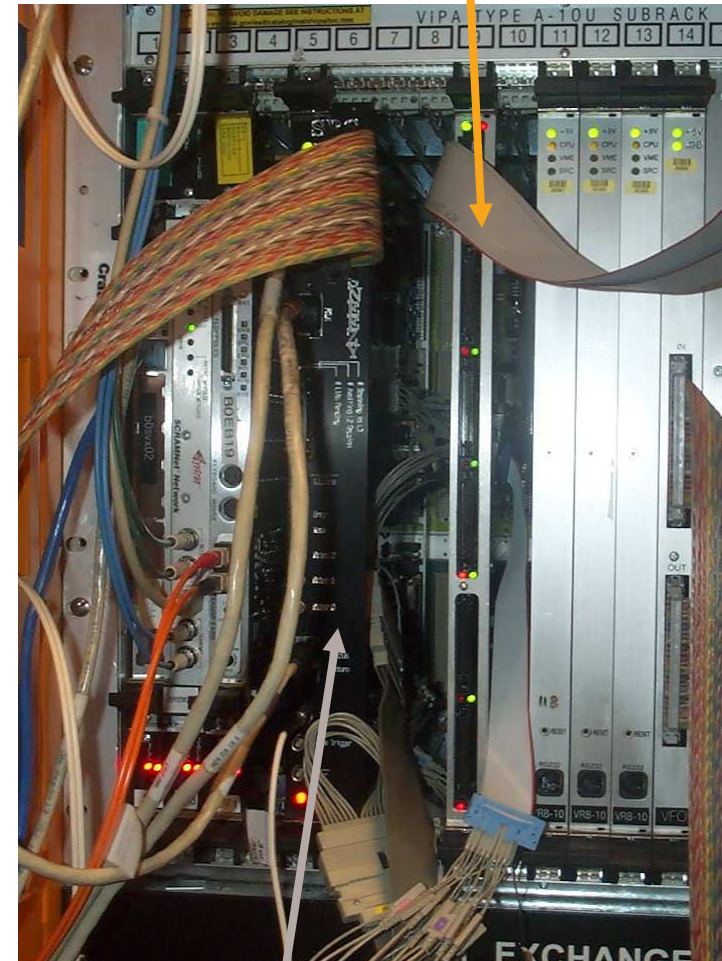
- **SRC Fatal Error: SL 5 Resonance detected:** A resonance condition was detected which is potentially harmful for the silicon. Note that only b0svx02 and b0turns **RED** first, then on HALT you will receive the error message.

Additional information on HALT

(MLE) b0svx04:Messenger:1:51:03 PM->Silicon
Resonator:S1 18 Ch 1 -> e481: Bytes: 00064

(MLE)b0svx00:Messenger:1:51:03 PM->Silicon
Resonator:S1 20 Ch 6 -> e0b1: Bytes: 00040

- RECOVER and RUN once, on 2nd time page silicon.



SRC

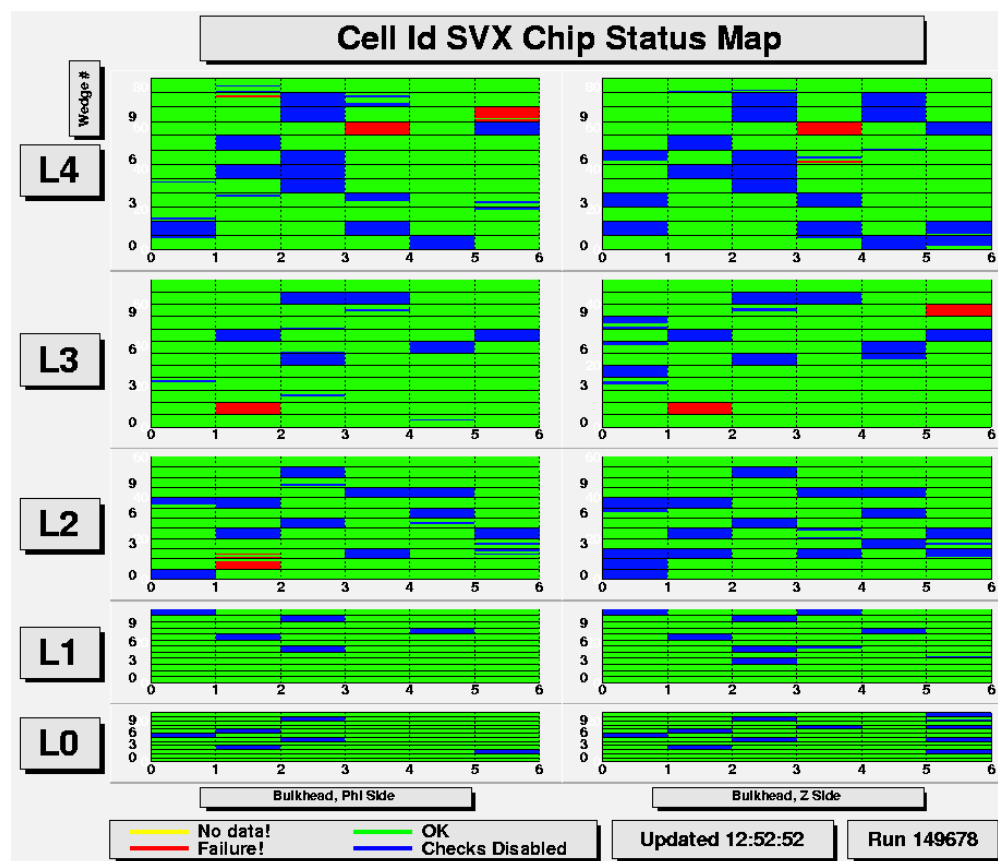
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Quick SVXMon Tutorial

- SVXMon used for automatic checking of silicon data quality *and to intervene w/ run control in certain cases.*
 - SVXMon generates auto-HRR in case of Cell Id errors (plot from SVXMon slides)
 - Max. rate every 2.5 mins.
 - Monitor history of automatic HRR with SvxErroLogger
 - In case of constant HRR from SVXMon, page silicon*
 - For unbiased silicon pop-up error windows
 - Follow instructions
 - Page Silicon



Web Documentation

www-cdfonline/mcs/mondoc.html

Silicon



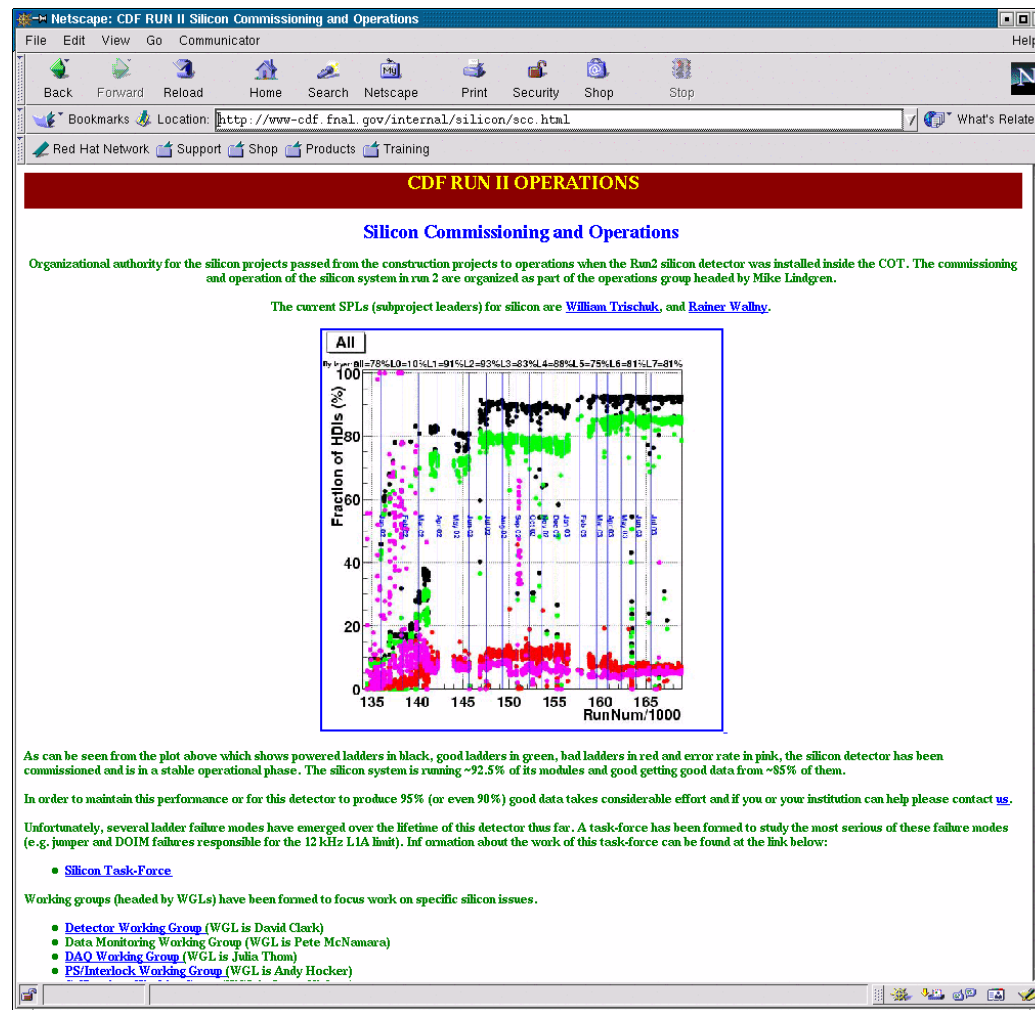
CDF Hardware Monitoring Documentation				
John Yeh, J. C. Yun				
CDF iFix Slow	Controls (MCS)	ACNET -Beam	Utilities + Safety	DAQ, Misc
Tutorial - Homepage Instructions to Shift Recovery Procedure	Web-Server Pics Access Security	Tutorial Shot Setup - RadMon Aces' ACNET plots	Monitoring Ace Page	DAQ Ace info Operations page
Legend : READY , Preliminary , Not yet available In case of problems with systems that do not yet have recovery procedure available, Please click here for Expert call-in phone lists .				
COT HV	MUONS - HV	CES-CCR-CPR	CEM,C/WHA,GAM	Trigger Inhibit
Instructions to Shift	Instructions to Shift Trip Recovery	Intruction to Shift	Tutorial Instructions to Shift Recovery Procedure	Design Notes
SVX, ISL, L00	CSX, CSP	TOF	PEM-PHA-PSH	Icicle DB
Instructions to Shift Cooling/PS Recovery Procedures Radiation Mon		Shift Instructions	Not Available	Not Available
MNP, RPS	BSC	CLC	PTM plug temp	PSM power sup
		Instructions to Shift	Instruction, Recover	See the Alarm Help Section on the VoltMan page for PSM trips.
PC BACKUP	xxx	Template	xxx	xxx
Procedure What items Other Info	Not Available	Tutorial Instructions to Shift Recovery Procedure	Not Available	

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www-cdf.fnal.gov/internal/silicon/scc.html



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CDF Monitoring Ace Silicon Instructions

As a monitoring ace, your silicon responsibilities are to:

1. MONITOR BEAM conditions using TeVMon and ACNET as follows:
 - Check SVX DANGER status in TeVMon:
 - If SVX DANGER is **PINK** page silicon (218-8227)
 - If SVX DANGER is **RED** bring HV to standby and page silicon (218-8227)
 - At least once per hour, make the following ACNET plots *and* place them in the e-log:
 - Shift Losses (C:LOSTP, C:LOSTPB, C:B0PLOS, C:B0ALOS)
 - SI-Test1 (T:L1COLI, T:RFSUM, C:B0PBSM, C:B0RAT4)
 - SI-Test2 (T:SBDMS, T:RFSUMA, C:B0ABSM, C:B0ILUM)
 - At least once per hour, check that the following criteria are satisfied:
 - The electron lens is ON (L1COLI > 0).
 - Losses are acceptable (LOSTP, LOSTPB < 20.0 kHz).
 - Losses are not growing rapidly (delta LOSTP, delta LOSTPB < 2.5 kHz/hour).
 - Losses are stable (NO spikes > 25 kHz).
 - There is no sudden increase/decrease in luminosity (delta B0ILUM < 10%).
 - RF is stable (delta RFSUM, delta RFSUMA < 0.25/min).

If ANY of these criteria are *even momentarily* not satisfied, page silicon (218-8227).
2. CONTACT SILICON expert when anti-protons are being loaded.
 - Page 218-8227 (main silicon pager).
 - Alert silicon expert that store is in.
 - Report SVX DANGER status in TeVMon to silicon expert:
 - If SVX DANGER is GREEN silicon HV can be ramped up at silicon expert's discretion.
 - If SVX DANGER is **RED** or **PINK** silicon can not be included. Have SciCo call MCR to address problem.
 - If silicon expert decides beam conditions are ok, they will instruct you to ramp up HV.
3. REACT to loud noises and/or non-green color from IFix.
 - Be familiar with and follow the following specific recovery procedures:
 - [Power supply alarm/trip](#)
 - [Cooling problems/interlock trip](#)
 - [Loss of HV monitoring](#)
 - [Loss of alarm monitoring](#)
 - ["Alarm: Heartbeat"](#)

CDF RUN II COMMISSIONING

Recovery Procedures for Silicon Cooling/Power

Note: in what follows, "Alarm List" refers to the iFix page that pops up when the "D" button on the Global Alarms page is clicked. Clicking the box that says "SVX," "ISL," or "L00" pops up something called an iFix Alarm Summary Object, which is a lot like an alarm list, except that it sucks.

1. POWER SUPPLY TRIP

Symptom: A box goes red and tweets. IN ADDITION, the bars and status box on the HV summary page go red.

What should you do? Check the Alarm List. From there you will be able to read what ladder has tripped (B1W2 L3, for a random example). Page 218.8227 armed with this information and the expert will help you recover. *Note: if, after recovery, the iFix alarms haven't cleared, try clicking "Reset Trips in CAEN" on the PS GUI.*

2. COOLING PROBLEMS/INTERLOCK TRIP

Symptom: These are signalled by either of the following:

1. The "SILICON Cooling" box on the iFix "Process Systems ALARMS" page goes red and LOUD sirens blare (can only be silenced by the cryo techs)
2. The silicon sono-alarms (located on the patch panel in rack 2RR04B) emit a loud, sustained, annoying beep (can be silenced by flipping the switch beneath them)

What should you do? The VERY FIRST THING YOU SHOULD DO is check the silicon PS GUI. If it is stuck (i.e. not counting down, see below), or if it is spewing out LOTS of messages like "ALERT" or "ILLEGAL," then **hit the Silicon Rack Power Crash Button** located underneath the sono-alarms.

In any event, page 218.8227 and the [on-call cooling/interlock expert](#) at 218.8626. They will help you recover. At the end of it all, make sure the sono-alarm switches are returned to "NOT SILENCED" and the cryo techs have unsilenced the Process Systems alarms.

Note: A non-severe cooling problem can be signalled by a red (or yellow) tweety iFix alarm that is not accompanied by a sono-alarm or a Process Systems alarm. These are rare enough that we would like you to page the [on-call cooling/interlock expert](#) at 218.8626 so we can understand the problem.

3. LOSS OF HV MONITORING

Symptom: ALL THREE silicon boxes (SVX/ISL/L00) go red and tweet at the same time. The Alarm List shows "GUI/iFix communication: NOT OK." After some amount of time (could be seconds, could be minutes), the three silicon heartbeat boxes on the HV summary page go purple.

What should you do? Check the silicon PS GUI and see if it is updating (look in the upper left corner of the window where it says "next update." It should count down from 7, stop for a few seconds at 1, then start counting down again). If it seems to be stuck,

1. Wait a little longer, like 30 seconds. If you have just recently turned a bunch of power supplies on or off, wait even longer, like 5 minutes.
2. If it's still stuck, restart the GUI by following [these instructions](#) (also posted on the GUI PC -- and they ought to be identical!)
3. If the GUI does not restart gracefully, page the GUI expert at 266.0555.
4. If the GUI restarted OK, the alarms should disappear. If they remain, or if the GUI never seemed to be stuck in the first place, page the [on-call cooling/interlock expert](#) at 218.8626. S/he will either take care of it or tell you how to take care of it.

4. LOSS OF ALARM MONITORING

ment: Done (0.391 secs)



Useful DAQ Hints for ACEs

www-cdf.fnal.gov/internal/silicon/silicon_commission/daq/sidaq_sop.html

CDF RUN II Silicon

Silicon DAQ Standard Operating Procedures

Introduction

Here is the list of Standard Operating Procedures for running and maintaining the Silicon DAQ. They are geared toward Aces and Non-Expert Silicon people. In all cases you should make a note in the elog with run number and a snippet of the problem.

- [Unresponsive Fib \(b0fibXX\) or Vrb \(b0svxXX\) crate](#)
- [Failed Warm/Cold Start from Fib](#)
- [Failed Warm/Cold Start from Vrb](#)
- ["No response from the Fib" when powering up Silicon wedges](#)
- [BUSY Timeout from b0svx02](#)
- [DONE Timeout from b0svx02](#)
- [High Rate of RF errors](#)
- [How to Decode a Fib Id](#)
- [How to Mask Init Readback on an HDI](#)
- [How to Chop a Chip Chain](#)
- [How to Download Sequences](#)
- [Power Outage](#)

Who to Call

www-cdf.fnal.gov/internal/silicon/silicon_commission/pager.html

CDF RUN II OPERATIONS

Silicon Pager Numbers

For Aces

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System	Pager Number	Usage
Main Silicon	218-8227	All things Silicon
SPL online (Rainer Wallny)	722-7483	Backup of Main Pager
SPL offline (William Trischuk)	1-416-919-7694 (cell)	Backup of online SPL
Cooling/Interlocks	218-8626	Silicon Cooling Problem
Rad-Co	266-2713	Radiation Alarm

For Experts to page only

System	Pager Number	Usage
PS GUI	266-0555	GUI anomalies
DAQ	218-8940	DAQ meltdown
Power Supplies	314-0128	PS oddities
Monitoring	722-8729	Obsolete?

Last Updated August 18th, 2003 by [Rainer Wallny](#)

100% Document: Done.

Conclusion

Your main responsibility to silicon is to help keep it **safe**.

BETTER SAFE THEN SORRY!

When in doubt, page main pager carrier at 218.8227...

If no answer, page online SPL at 722.7483...

(Better page once too many than once too few ...)
if no response, turn it to **STANDBY**
(or **OFF** if there's a cooling problem).